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CLAIMS

1. An instrumented tubular device for transporting a pressurized fluid comprising a tube (20) in which this fluid flows, with which are associated means for measuring the main deformations of this tube, and means for measuring the temperature of the fluid in the tube, characterized in that this tube is equipped with measurement means fixed onto this surface and offset by at least one remote optical cable (23) towards an optoelectronic measurement system, in that these measurement means comprise at least three assemblies (B1, B2 and B3) of at least two optical gages with Bragg gratings, arranged along non-parallel directions, said at least three assemblies (22) being fixed in at least three measurement locations (22) distributed in different positions along the axis of the tube, and orientated along several axes of its section are distributed along the tube, these assemblies (B1, B2 and B3) being connected together (24) and connected to the remote optical cable (23) via optical fibers, and in that at least one assembly further comprises a temperature gage.

2. The device according to claim 1, wherein the measurement means are preassembled on a support.

3. The device according to claim 1, wherein the measurement means are directly attached on the remote cable (23).

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4. The device according to claim 1, wherein the measurement means are assembled in order to form at least one rosette.

5. The device according to claim 4, wherein each rosette forms a two-dimensional flexible sensor.

6. The device according to claim 1, wherein each assembly comprises three gages for measuring deformations of the tube.

7. The device according to claim 5, wherein each sensor comprises a portion for measuring deformations (40) and a portion for measuring temperature (45).

8. The device according to claim 7, wherein the portion for measuring deformations (40) consists of a single mode optical fiber (41), on which Bragg gratings (42, 43 and 44) have been photo-inscribed, wound and kept bonded between two sheets, the fiber inputs-outputs being protected by capillaries (51).

9. The device according to claim 8, wherein the fiber portions including Bragg gratings (42, 43 and 44) are exposed.

10. The device according to claim 7, wherein the portion for measuring temperature (45) comprises a Bragg grating (46) bonded on a metal plate (47).

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11. The device according to claim 10, wherein the metal plate is of the same nature as the metal of the tube.

12. The device according to claim 5, which comprises at least three measurement casings (B1, B2, B3), in which three sensors isolated from the external hydrostatic pressure and connected through tubular connectors (24) are positioned respectively.

13. The device according to claim 12, wherein the central casing (B2) is connected to the measurement instrumentation through a remote optical cable (23).

14. The device according to claim 12, wherein the casings and the connectors are welded to each other so as to form a rigid assembly.

15. The device according to claim 12, wherein the remote cable (61) consists of a stainless steel tube (64) filled with gel and containing several single mode optical fibers (65), of a weave of steel wires (67) separated by plastic sheaths.

16. The device according to claim 15, wherein the central casing (B2) incorporates a base (63) intended for making the connection with the remote optical cable (61).

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17. The device according to claim 5, which comprises at least one assembly of three sensors (71) covered with a protective coating (73).

18. The device according to claim 17, wherein the coating (73) is a polymer coating with a thickness between 3 and 4 centimeters.

19. The device according to claim 17, wherein a distribution box provides the connection between the sensors of each assembly and a main optical cable connected to the measurement instrumentation.

20. The device according to claim 17, wherein spreading out of strain on the main cable is performed by strapping this cable along the tube.

21. The device according to claim 17, wherein the remote cable is included in the protective coating.

22. The device according to any of the preceding claims, wherein the transported fluid is a gas or a hydrocarbon.